

ART. I.—*Observations on Donati's Comet, made between Oct. 12th and Nov. 12th, 1858.* By LUDWIG BECKER, Esq.

(With five Plates.)

[Read before the Institute, March 30th, 1859.]

DONATI'S Comet was first seen at Melbourne a little before seven o'clock on the evening of the 11th October, 1858. Previously to that date the sky had been clouded for several days, and as it was not known then, on our side of the globe, that a Comet, visible to the naked eye, was near us, its appearance surprised every one who noted the beauty of the evening of the 11th of October. The silvery twilight near the horizon formed the base of a well-developed zodiacal-light, the pink-colored upper part of which reached the deep indigo of an almost tropical evening sky. The young moon stood, like a key-stone, on the top of the pointed arch of the zodiacal-light; and close to her, in her greatest brightness, Venus and the fiery Antares. Looking at that splendid constellation, the observer perceived, nearly due west, a streak of light like a small, lonely cloud. There it stood, motionless, its luminosity slowly increasing—and before a minute of time had passed on, the cry was heard:—a Comet, lo! a Comet!

On the following day (12th Oct.) I made every preparation at the Magnetical Observatory, on the Flagstaff Hill, to procure as good and as many drawings of the Comet as possible. In this Professor Neumayer, the director of the magnetical survey, most kindly assisted me, by allowing me the use of his largest telescope, from Munich (Steinheil's), and supplying me with some necessary exact data.

Place of observation:—Melbourne, Flagstaff Hill Observatory, lat. 37°48 S., long. 145 E.; elevation above sea, 120 feet.

The refractor used had a magnifying power of 79 linear; diameter of object glass, 3·020 inches; diameter of ocular glass, 0·"6; focal length, 51·16 inches.

FIG. I.*—(Oct. 12.)

[Sky, perfectly clear; wind, S.E., very light; barometer (reduced to 32° Fahr.), 29·95; thermometer, 54·9; electricity (according to Quetelet's electrometer), +7·09; remarks, lightning towards E.]

* Each Fig. shows generally two representations of the Comet, the one as seen with the naked eye, the other as it appeared in the telescope; but having the reversed image in the refractor drawn, according to nature, in its true position.—L. B.

First appearance of Comet to the naked eye, at 6h. 45m. 54s. p.m., Melbourne mean time; altitude, $17^{\circ} 24'$.

FIG. II.—Eleven minutes later; the tail, or rather as it now appeared, the wings were more visible, and I observed a very peculiar pulsation in the luminous matter gathered round the nucleus and forming the wings. Suddenly the wings were extended (as shown in Fig. II.), where the dark space between the wings is seen to come almost close up to the nucleus; as suddenly the wings were retracted, or sheathed up (as shown in Fig. III.), where they are shortened, and the luminous matter connects them together for a great distance from the nucleus. When the wings were retracted they appeared less distinct. The time required to produce these effects was only one second, half of which was occupied by the light leaving the neighbourhood of the nucleus, the other half in returning to the same. Fig. II. represents the head of Comet and part of the tail, or the wings, as seen when the pulsating light has gone forth at 6h. 56m. 54s., while

FIG. III. represents Comet and tail, or wings, half a second later, viz., 6h. 56m. 54s.5., with the same light brought home again. This playing of the luminous matter was most distinctly visible to the naked eye, and reminded one of the up-rising rays of light during an aurora, with this difference, that the pulsation, apparently in the Comet, was infinitely swifter. The space traversed during one-half of a second was from one-third to one-half of the whole length of the tail. This phenomenon, after several irregular intervals, lasted till the Comet, later in the evening, appeared in full brilliancy, about half-way between the point where it was first visible after sunset, and the horizon. This phenomenon was most distinct when it commenced, and was gradually lost in the full light of the Comet.

FIG. IV.—The Comet in its fullest light at about 7h. 37m. Nucleus of an oval shape, more convex on that part which faces the sun, less so on the opposite side; of a dull, pale-yellowish color; apparent diameter of nucleus, about one-fourth of the diameter of Venus. In front of nucleus, and touching the same, is a band of light, which, turning round on each side and backwards, enters the tail. In front of that band of light is a less defined and less intense layer of lumi-

Fig. I.



Fig. II.



Fig. III.





